Investigation of a Fall Spawning Run of Lake Whitefish into the Little Buffalo River, Northwest Territories

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June 1985

Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1820

85-5615/

Canadian Manuscript Report of Fisheries and Aquatic Sciences

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Canadian Manuscript Report of
Fisheries and Aquatic Sciences 1820

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INVESTIGATION OF A FALL SPAWNING RUN OF LAKE WHITEFISH INTO THE LITTLE BUFFALO RIVER, NORTHWEST TERRITORIES

by

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This is the 51st Manuscript Report
from the Western Region, Winnipeg

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Cat. no. Fs 97-4/1820E ISSN 0706-6473

Correct citation for this publication is:

Roberge, M.M., G. Low, and C.J. Read. 1985. Investigation of a fall spawning run of lake whitefish into the Little Buffalo River, Northwest Territories. Can. Manuscr. Rep. Fish. Aquat. Sci. 1820: v + 31 p.

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ABSTRACT

Roberge, M.M., G. Low, and C.J. Read. 1985. Investigation of a fall spawning run of lake whitefish into the Little Buffalo River, Northwest Territories. Can. Manuscr. Rep. Fish. Aquat. Sci. 1820: v + 31 p.

In 1975, a study was conducted on the fall spawning run of lake whitefish, Coregonus clupeaformis (Mitchill) into the Little Buffalo River, Northwest Territories to collect biological data from a discrete spawning group of lake whitefish and gather information on lake whitefish post-spawning dispersal patterns. Additional information on the post-spawning dispersal patterns and the relationship of Little Buffalo River lake whitefish to both the domestic and commercial fisheries of Great Slave Lake was undertaken in 1977.

Little Buffalo River lake whitefish spawn in late September-October. Post spawning movement appears to be restricted; the maximum distance travelled was approximately 70 km. The domestic fishery relies heavily on lake whitefish from Little Buffalo River while exploitation by the Great Slave Lake commercial fishery appears to be light.

Mean lengths of lake whitefish were 376 mm and 389 mm and mean ages were 7.2 yr and 8.6 yr in 1975 and 1977 respectively. In 1975 the youngest spawners, male and female were 5 yr while in 1977 the youngest male spawners were 7 yr and the youngest females were 8 yr. Fecundity was estimated to be 18 743 ova per female. Weight-length relationships were calculated. Total instantaneous annual mortality (Z) was 1.38 in 1975 and 0.97 in 1977.

Key words: Coregonus clupeaformis; fecundity; fish counters; gillnets; migrations; seining; tagging.

RESUME

Roberge, M.M., G. Low, and C.J. Read. 1985. Investigation of a fall spawning run of lake whitefish into the Little Buffalo River, Northwest Territories. Can. Manuscr. Rep. Fish. Aquat. Sci. 1820: v + 31 p.

En 1975, la remonte automnale de grand corégone, Coregonus clupeaformis (Mitchill), a été étudiée dans la Petite rivière Buffalo, Territoires du Nord-Ouest, en vue de recueillir de l'information sur la dispersion de cette espèce après la fraye et des données biologiques à partir d'un groupe discret de reproducteurs. En 1977, d'autres données ont été obtenues sur la dispersion du grand corégone après la fraye et sur le rapport entre les individus fréquentant la Petite rivière Buffalo et les pêches familiale et commerciale du Grande lac des Esclaves.

Le grand corégone de la Petite rivière Buffalo fraye de la fin septembre jusqu'en octobre. Les déplacements postérieurs à la fraye sont limités: la distance maximale parcourue est d'environ 70 km. Le grand corégone de la Petite rivière Buffalo est une ressource très importante pour la pêche familiale, mais il semble peu exploité par la pêche commerciale dans le Grand lac des Esclaves.

En 1975 et en 1977, la longueur moyenne des grands corégones était respectivement de 376 et 388 mm et leur âge moyen, de 7,2 et 8,5 ans. En 1975, les plus jeunes reproducteurs, mâles et femelles, avaient 5 ans, tandis qu'en 1977, les mâles et les femelles reproducteurs les plus jeunes avaient respectivement 7 et 8 ans. La fécondité était estimée à 17 740 oeufs par femelle. Des rapports poids-longueur ont été établis. Au total, la mortalité annuelle instantanée était de 0,70 en 1975 et de 0,67 en 1977.

Mots-clés: Coregonus clupeaformis; fécondité; compteurs de poissons; filets maillants; migrations; sennage; étiquetage.

INTRODUCTION

Lake whitefish, Coregonus clupeaformis (Mitchill) is widely distributed throughout Canada and is one of its most valuable commercial freshwater fish (Scott and Crossman 1973). In the Northwest Territories, lake whitefish is one of the two most important commercial species sought; the largest whitefish commercial fishery being located on Great Slave Lake. Monitoring studies conducted since the inception of the Great Slave Lake commercial fishery in 1945 have provided data on the general biology of this species in its northern range and have documented its response to exploitation (Rawson 1947, 1951; Kennedy 1953, 1954, 1956; Scott 1956; Bond 1974a, b, 1975a,b; Bond and Turnbull 1973; Moshenko and Low 1978, 1979, 1980; Moshenko et al. 1981; Roberge et al. 1982, 1984). However, by the late 1970's there still existed insufficient information on fecundity and breeding habits of lake whitefish. As well, many questions remained as to the location of spawning sites, post-spawning dispersal patterns and the existence of discrete subpopulations (currently under study).

Little Buffalo River, located on the south shore of Great Slave Lake is known to be utilized by a spawning run of lake whitefish from Great Slave Lake. In 1975 a study was initiated on these whitefish in an attempt to gather biological data from a discrete spawning group of lake whitefish and as well to acquire information on post-spawning dispersal patterns of whitefish. Further studies on post-spawning dispersal patterns were undertaken again in 1977 in order to obtain additional information on post-spawning movements of Little Buffalo River lake whitefish into Great Slave Lake and the relationship of these whitefish to the commercial and domestic fisheries occurring in the area.

STUDY AREA

The Little Buffalo River (61°00'N, 113°46'W) enters Great Slave Lake 20 km south of Fort Resolution (Fig. 1). It is 310 km in length with headwaters at Thultue Lake, Alberta. The drainage basin covers an area of 12 500 km^2 with a mean annual discharge of 5.1 $m^3 \cdot s^{-1}$ (range 0-22.8) (Water Survey of Canada 1980). Little Buffalo Falls, 145 km upstream from the mouth, is the first natural barrier to fish movement. Downstream from these falls Little Buffalo River flows through a single well defined channel to the mouth. This area is very shallow and completely freezes during the winter. The river has three major tributaries; the Sass, Klewi and Nyarling rivers. The surrounding terrain is mainly black spruce and larch muskeg interspersed with large well drained grasslands bordered by willow and aspen. The river is placid for much of its length with an organic-rich silt substrate. There are, however, several rapids below the confluence of the Nyarling River. The substrate, in these swifter reaches of the river, ranges from gravel to boulder with some areas of shale. The series of rapids make the river only marginally navigable by outboard powered boat. Boats must be lined or portaged around rapids except in extreme high water conditions.

Fish species known to inhabit the river include lake whitefish; northern pike, Esox lucius Linnaeus; burbot, Lota lota (Linnaeus); walleye, Stizostedion vitreum (Mitchill); inconnu, Stenodus leucichthys (Pallas); white sucker, Catostomus commersoni (Lacépède); and longnose sucker, Catostomus catostomus (Forster).

THE FISHERY

The autumn whitefish run into the Little Buffalo River is important as a subsistence (domestic) fishery to the families living at its mouth and to some families from nearby Fort Resolution. This fishery employs 102 mm mesh gillnets with the greatest fishing effort placed on the postspawning whitefish run in late September and October. Whitefish are smoked or frozen for domestic use; however, the bulk of the catch is hung in the round form as "stick fish" mainly for dog food. This method of storage involves puncturing the caudal area of the fish with a peeled willow stick and threading ten fish onto the stick. The fish-loaded sticks are then hung 2 to 3 m above the ground between two horizontal poles to keep them out of the reach of dogs and other scavengers. The cool autumn winds partially dehydrate the fish preserving them well enough for use during the winter months.

Commercial fishing occurs offshore from Little Buffalo River and outside the Fort Resolution domestic area in Area III (Fig. 1). Fishing effort in this area has been very light during 1975 to 1981 (Table 1). A significant increase in catch was reported in 1982 but has subsequently decreased.

Sport fishing on the Little Buffalo River is light. Sport fishermen occasionally angle for northern pike, walleye and inconnu during the summer months (Falk and Dahlke 1975).

METHODS AND MATERIALS

SUBSISTENCE HARVEST

The subsistence harvest of lake whitefish at the mouth of the Little Buffalo River was monitored each fall from 1975 to 1981. After fishing was completed the number of whitefish caught was directly counted by counting the number of sticks (ten fish per stick) supported on open air racks along the river banks and those fish in the smoke houses located in Fort Resolution. As well, the number of whitefish used for personal consumption during the fishery was estimated and that amount added to the number of fish processed by air drying and smoking. The weight of the catch was calculated by multiplying the total number of whitefish caught by the mean weight of whitefish (approximately 780 g) caught by the 102 mm gillnets used during the 1975 study.

COLLECTION METHODS

Fish weir and traps

In 1975 the study was conducted between 20 August and 7 October. A fish weir was set in place by 20 August 19 km upstream from Great Slave Lake above a riffle area in approximately 1 m of water (Fig. 2). The weir was a modified "X" structure consisting of separate upstream and downstream traps (Appendix 1). The traps, 1.2 m wide and 2.4 m long, were covered with 2.5 cm mesh galvanized screen. Fish entered through a 10 cm wide vertical slit. All fish caught in the traps were enumerated. Lake whitefish were either measured, tagged and released or sampled for additional biological information. All other fish species caught were biological sampled. The weir remained in operation until 26 August when it was washed out by high flood waters.

Gillnetting and seining

The study was subsequently resumed on 3 September and continued until 10 September using 102 mm mesh gillnets. All whitefish caught were biological sampled. The study recommenced on 17 September and continued until 7 October. During this time fish were again caught by gillnets (102 and 114 mm mesh) as well as by a seine net (25 mm mesh). All whitefish caught by seining were measured, tagged and released; all other fish were released. Whitefish caught by gillnetting were either measured, tagged and released or biological sampled. All other fish were biological sampled.

In 1977 fish were caught using gillnets (114 mm mesh) from 20-22 September. The nets were set at the same location as in 1975. Whitefish were either measured, tagged and released or biological sampled. All other fish caught were biological sampled.

TAGGING

Prior to tagging, whitefish were measured for fork length (±1 mm) and a small scale sample was taken from the area below the anterior margin of the dorsal fin above the lateral line for aging. Weight measurements were not taken in order to reduce stress and physical damage to the fish. A model FDM-68 Dennison tagging gun was used to apply serially numbered Floy tags. Tags were inserted near the base of the dorsal fin and anchored firmly between the posterior pterygiophores. The fish were then released directly into the river. Initial survival appeared to be excellent for seined and trapped fish, however, a small percentage of tagged fish captured by gillnetting showed stress after release and had to be retrieved. Evidence of mortality after the first day of release was not apparent in the shallow river. A total of 973 lake whitefish were tagged in 1975 and 200 in 1977.

Tagged fish were subsequently recaptured by subsistence and commercial fishermen and by Department of Fisheries and Oceans (DFO) personnel. A reward was offered for each tag returned. Information received generally included the date and location of recapture. On occasion, fishermen returned several tags at once which had been caught over a month-long period without specific recapture dates. In such cases the median date was used when calculating the number of days between tagging and recapture. Distance travelled implies the most direct route by water from the release location to the point of recapture.

BIOLOGICAL SAMPLING

Fish were sampled for fork length (±1 mm), round weight (±50 g), aging structure (scales), sex and stage of maturity. Sex and relative stage of maturity were determined by examination of the gonads and coded according to the stages described by Falk et al. (1982).

Scales were removed as described by Hatfield et al. (1972) and stored dry in coin envelopes. In the laboratory, scales were mounted between glass slides and the completed annuli counted on the image produced by an Eberbach microprojector (×40).

Ovaries from mature female whitefish were collected in September, 1975, and preserved in Gilson's fluid. In the laboratory fecundity was determined by the gravimetric method based on Healey and Nicol (1975) and using the following procedure:

1. Ovum mass was crumbled into a funnel and residual and atretic ova were washed out through a 1.5 mm mesh screen leaving only mature ova.
2. Ovarian tissue was floated off or removed with forceps.
3. Ova were spread, one layer thick, on enamel trays and allowed to dry at room temperature until constant weight was achieved (36-48 h).
4. A subsample of 3 000 ova was counted out and weighed (± 10 mg).
5. The number of ova per ovary was then calculated as follows:

$$\text{Fecundity} = \frac{\text{Total weight of ova}}{\text{Weight of subsample}} \times N$$

where N = number of ova in subsample.

A qualitative analysis of the food types consumed by lake whitefish, northern pike and walleye caught in 1975 was made by examination of stomach contents. The food type was identified as being either fish remains (species unknown), benthic invertebrates, vegetation, fish eggs or unidentified remains (Appendix 2).

DATA ANALYSIS

Data collected were analyzed using an Amdahl 470/U7 computer. The Statistical Analysis System (1979) was used to generate length, weight, age, sex and maturity summaries and to perform basic calculations.

Weight-length relationships were calculated using least squares regression analysis on

logarithmic transformations of fork length and round weight. The relationship is described by the following equation:

$$\log_{10}W = a + b(\log_{10}L)$$

where W = weight in grams
L = fork length in millimeters

Relative condition factor (K), a measure of the plumpness of a fish, was determined using the formula:

$$K = \frac{W \times 10^5}{L^3}$$

where w = weight in grams
L = fork length in millimeters

Instantaneous total mortality (Z) was calculated from the least squares regression line fitted to the descending limb of the catch curves. Catch curves were fitted by eye and only that portion of the curve that appeared linear was included in the analysis. Ricker (1975) indicated that the modal age in the catch curve will commonly lie close to the first year in which recruitment can be considered effectively complete. Therefore only the next older and subsequent age groups from the modal age are used in calculating Z.

WATER LEVEL AND TEMPERATURES

On 18 August 1975 a water level gauging station was set up on Little Buffalo River below the fish weir site near the east bank of the river. Datum, used to record fluctuations in water level, was set arbitrarily at 59 cm and read each day (Appendix 14).

A thermometer (max/min) was submerged in the water at the water level guaging station and temperature readings were recorded at approximately the same time each morning. Concurrently daily air temperatures were recorded from a max/min thermometer placed in the shade of the forest canopy located near the gauging station (Appendix 14).

RESULTS AND DISCUSSION

TIME OF SPAWNING

Lake whitefish were caught in Little Buffalo River from 20 August to 7 October 1975. The number of whitefish caught in the fish trap (20-26 August) ranged from 35 on 20 August to 1 on 26 August (Fig. 3). Catch per unit of effort (no. of fish/47.5 m net/24 h) indicated the relative abundance of lake whitefish caught by gillnets (102 and 114 mm mesh) in the spawning area from 3 September to 7 October (Fig. 3). Despite gaps in sampling, concentrated movement into the spawning area appears to have begun by 25 September. Water temperature during this movement (25 September to 7 October) ranged from 10°C to 6°C (Appendix 14). Mean length (Table 2) and mean age (Table 3) of lake whitefish captured at different time intervals during the upstream run were compared. Fish caught by seine net were not combined with those caught by gillnets, since they were found to be significantly different ($P<0.05$) in both size and age. Analysis of covariance indicated no signficiant difference ($F>0.01$) in either mean length or mean age of fish caught throughtout the course of the run. However there was an increase in the size and age ranges as the spawning run progressed indicating that large and older fish were moving upstream.

Whitefish identified as mature were caught throughout the entire study (Table 4); only one immature whitefish was encountered. Whitefish identified as ripe and ready for spawning were first encountered 27 September while spent males and females were first found on 30 September and 5 October, respectively. Therefore, spawning is assumed to take place from late September to October which agrees with the findings of Rawson (1947) on lake whitefish from Great Slave Lake.

It also does not seem feasible that adult lake whitefish overwinter in the Little Buffalo River after spawning, but instead migrate back to Great Slave Lake since the river is very shallow and completely freezes during the winter. This postspawning movement is also indicated by the high number of tag returns at the mouth of the Little Buffalo River during the postspawning run.

FREQUENCY OF SPAWNING

Kennedy (1953) stated that lake whitefish from Great Slave Lake do not spawn every year. He found upon "examination that there were two easily distinguished conditions of the gonad among mature fish" i.e. "large eggs" and "small eggs". All whitefish from the Little Buffalo River, with only one exception, were identified as being current year spawners (mature) (Table 4). Whitefish utilizing Little Buffalo River for spawning may be annual spawners; or it may be that only the current year spawners migrate up the river.

POSTSPAWNING DISPERSAL PATTERNS

Lake whitefish spawning in the Little Buffalo River probably do not overwinter in the river but migrate back into Great Slave Lake as indicated by the tag recoveries; as well, the river is very shallow and completely freezes during winter. Eighty-four percent of tag recoveries for fish tagged in 1975 and 100% for fish tagged in 1977 were from the domestic fisheries which take place at the mouth of the Little Buffalo River and near Fort Resolution. These recoveries would indicate that the whitefish are vulnerable to capture throughout the year within about 35 km of the mouth of the river (Table 5 and 6). It may also be a reflection of the location of the fisheries in which the tags were recovered.

Commercial fishing in Great Slave Lake in the vicinity of Little Buffalo River (Administrative Area III) has generally been light (Table 1). Few tagged whitefish have been taken

by this fishery (4 tags recovered in the Sulphur Point area, a distance of approximately 70 km from the tagging site (Table 5)) nor by the commercial fisheries in other administrative areas where fishing effort is greater. Since few tagged whitefish have been taken by these fisheries it may be that the Little Buffalo River whitefish remain within Administrative Area III and are only lightly exploited by the commercial fishery in comparison to the domestic fishery. However the gear used to capture lake whitefish from the Little Buffalo River for tagging was size selective and smaller than that used in the commercial fishery (139 mm) (Roberge et al. 1982). There is a signficant difference ($P<0.05$) in the size and age of lake whitefish tagged from the Little Buffalo River and those captured by the commercial fishery. Therefore it may be that the larger, older whitefish utilizing Little Buffalo River and which may be exploited by the commercial fishery were not tagged. This may be an explanation as to why so few tagged whitefish were taken by the commercial fishery in Area III besides the fact that fishing was light in this area.

BIOLOGICAL INVESTIGATION

The mean length of lake whitefish caught in Little Buffalo River in 1975 was 376 mm (range = 310-460 mm) (Table 7). Mean length of lake whitefish caught by the 114 mm gillnets in 1975 (380 mm) (Table 8) was significantly different ($P<0.05$) when compared to whitefish caught using the same gear in 1977 (389 mm) (Table 9). Mean age of lake whitefish caught in 1975 was for 2 yr (range = 5-13 yr) (Table 10). Mean age of whitefish caught by the 114 mm gillnets in 1975 (7.3 yr) (Table 11) was significantly different ($P<0.05$) from whitefish caught in 1977 (8.6 yr) (Table 12). The differences in mean length and age of whitefish between 1975 and 1977 may be the result of year class strength. Figures 5 and 6 show that the 1969 and 1970 year classes were well represented in 1975 and again in 1977. It is also probable that some variation may be due to the timing of the spawning runs between years.

In 1975 the youngest spawners, male and female, were 5 years old. However in 1977 the youngest spawning males were 7 years old while the youngest females were 8 years old. In comparison, a sample of lake whitefish taken in 1972 from Hay River and the Union Island area of Great Slave Lake showed the age at first maturity was 5 yr and 6 yr respectively (Bond and Turnbull 1973).

Mean number of ova per female was 18 743 (range = 11 352-33 861 ova) (Table 13). Fork length of females sampled ranged from 369 mm to 441 mm (mean = 391 mm) and weight ranged from 600 g to 1 000 g (mean = 858 g). Mean age was 7.9 yr (range = 7-10 yr). In comparison the mean number of ova per female for lake whitefish caught in 1950 in the vicinity of Gros Cap, Great Slave Lake, was 34 200 (range = 8 000-89 000 ova) (Kennedy 1953).

The weight-length relationship for lake whitefish from Little Buffalo River in 1975 is as follows:

$$\log_{10}W = -4.761 + 2.968 \log_{10}L;$$
$$(S_b = 0.05;\ N = 1121).$$

The total instanteous mortality rate for lake whitefish was calculated to be 1.38 and 0.97, in 1975 and 1977, respectively (Table 14). According to Healey (1975) these rates are indicative of a moderately exploited fishery.

CONCLUSIONS

The fall spawning run of lake whitefish from Little Buffalo River is important especially to the subsistence fishery occurring at the mouth of the river regardless of the fact that harvest levels have fluctuated over the years. Tag returns by the domestic fishery of whitefish tagged in 1977 indicate a 55.5% rate of exploitation. Exploitation of lake whitefish by the Great Slave Lake commercial fishery in Area III has historically been light. Tag returns from this fishery indicate that the Little Buffalo River whitefish are only lightly exploited since so few tags (0.5%) were picked up by this fishery. However exploitation by the commercial fishery may be higher if the low number of tag returns is due in part to the difference in size and age of those fish that were originally tagged in comparison to whitefish caught by the commercial fishery.

Post-spawning dispersal of Little Buffalo whitefish appears to be limited; maximum distance travelled was 70 km. No tagged fish were captured outside of Area III which suggests that Little Buffalo River whitefish remain within the vicinity of Area III.

Mean lengths of lake whitefish were 376 mm and 389 mm and mean ages were 7.2 yr and 8.6 yr in 1975 and 1977 respectively. Differences in size and age is attributed mainly to variability in year class strength and timing of spawning run. The youngest spawners, male and female were 5 yr. Fecundity was estimated at 18 740 ova per female. Mortality rates indicate that Little Buffalo River whitefish are only moderately exploited.

RECOMMENDATIONS

1. Annual monitoring of both the commercial and domestic fisheries within Administrative Area III, Great Slave Lake by the collection of catch/effort statistics.

2. Annual sampling of lake whitefish from the commercial fishery in Administrative Area III, Great Slave Lake by the collection of biological statistics including length and weight.

ACKNOWLEDGMENTS

The study was initiated by W.A. Bond in 1975 and continued in 1977 under the direction of R.W. Moshenko. The authors wish to thank the

following for their field assistance: B. Casper, L. Dahlke, D.V. Gillman, F. Hnytka, E. Howe, E. Quintal, D. Ruby, N. Luckhurst, and R. Sie. R.W. Moshenko reviewed an earlier version of this report. W.A. Bond and A.H. Kristofferson provided useful comments and criticisms of the report. Typing was done by B. Cohen. To all, the authors are very grateful.

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Table 1. Annual landings of lake whitefish (kilograms round weight) for the Great Slave Lake commercial fishery, Administrative Area III, and the Little Buffalo River domestic fishery, 1975-1983.

Year[1]	Commercial Harvest		Domestic Harvest		Total Harvest
	No.[2]	kg[3]	No.	kg	(kg)
1975	4 006	3 125	1 000	780	3 905
1976	1 041	812	2 000	1 560	2 372
1977	4 173	3 255	18 800	14 664	17 919
1978	6 228	4 858	4 000	3 120	7 978
1979	3 363	2 623	3 600	2 808	5 431
1980	10 318	8 048	12 500	9 750	17 798
1981	11 694	9 121	1 000	3 900	13 021
1982	56 736	70 863	N/A	N/A	N/A
1983	24 516	22 015	N/A	N/A	N/A

[1] Area III was established in 1979. Landings for 1975 to 1978 were calculated by individual fishermen from F.F.M.C. fish slips to correspond with the present Area III.

[2] Calculated based on mean weight of sampled fish from Administrative Area III.

[3] Dressed weight.

N/A = not available.

Table 2. Length-frequency of lake whitefish caught during different time intervals from Little Buffalo River, 1975.

August 20-26 (fish trap).

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
330	1	334	450	-	1.21	100	-	-	-	-	-	-	4	336	550	82	1.45	100
340	1	345	550	-	1.34	100	-	-	-	-	-	-	4	347	625	50	1.50	100
350	4	355	588	25	1.31	100	2	355	600	71	1.34	100	13	355	608	51	1.37	100
360	6	366	692	38	1.41	100	4	367	700	71	1.41	100	21	366	724	72	1.48	100
370	7	375	714	48	1.36	100	3	375	750	0	1.42	100	21	374	752	91	1.44	100
380	3	385	800	50	1.40	67	5	383	790	55	1.40	100	18	384	831	62	1.47	88
390	2	392	900	71	1.49	100	3	392	900	50	1.49	100	8	393	931	70	1.53	100
400	4	404	888	48	1.35	100	3	404	933	29	1.41	100	9	404	928	62	1.41	100
410	1	412	900	-	1.29	100	-	-	-	-	-	-	3	414	983	76	1.39	100
420	-	-	-	-	-	-	1	422	1100	-	1.46	100	4	424	1075	126	1.41	100
TOTAL	29						21						105					
MEAN		375	729	126	1.37			383	800	130	1.42			376	779	145	1.45	

September 3-10 (gillnets).

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
330	-	-	-	-	-	-	1	339	600	-	1.54	100	1	339	600	-	1.54	100
340	5	345	630	27	1.53	100	2	346	625	35	1.52	100	7	345	629	27	1.53	100
350	10	355	620	54	1.39	100	4	356	700	82	1.55	100	14	355	643	70	1.43	100
360	15	365	663	48	1.36	100	13	365	715	32	1.47	100	28	365	688	48	1.41	100
370	22	375	714	54	1.35	100	13	374	754	59	1.44	100	35	374	729	59	1.39	100
380	16	384	797	67	1.41	100	21	384	819	66	1.44	100	37	384	809	66	1.43	100
390	6	393	833	52	1.37	100	15	393	913	61	1.50	100	21	393	890	68	1.46	100
400	7	403	907	35	1.39	100	6	404	967	41	1.46	100	13	404	935	47	1.42	100
410	-	-	-	-	-	-	5	412	980	45	1.40	100	5	412	980	45	1.40	100
420	3	423	1017	58	1.34	100	2	426	1125	177	1.46	100	5	424	1060	114	1.39	100
430	-	-	-	-	-	-	1	432	1150	-	1.43	100	1	432	1150	-	1.43	100
440	-	-	-	-	-	-	1	441	1300	-	1.52	100	1	441	1300	-	1.52	100
TOTAL	84						84						168					
MEAN		376	740	113	1.38			384	834	136	1.46			380	787	133	1.42	

Table 2 (cont'd).

September 17-30 (gillnets).

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
310	-	-	-	-	-	-	-	-	-	-	-	-	2	319	-	-	-	-
320	-	-	-	-	-	-	-	-	-	-	-	-	3	324	-	-	-	-
330	1	339	500	-	1.28	100	1	334	500	-	1.34	100	15	336	500	0	1.31	100
340	2	344	625	35	1.54	100	4	345	600	71	1.46	100	47	344	608	58	1.49	100
350	11	356	632	40	1.40	100	10	356	680	48	1.50	100	107	355	655	50	1.45	100
360	11	365	673	47	1.38	100	16	364	716	63	1.48	100	154	365	698	60	1.44	100
370	14	373	729	38	1.40	100	29	375	766	58	1.46	100	173	374	753	55	1.44	100
380	19	384	803	56	1.42	100	23	384	854	67	1.51	100	157	384	831	67	1.47	100
390	11	394	832	64	1.35	100	35	394	894	96	1.47	100	125	394	879	93	1.44	100
400	9	403	900	66	1.37	100	14	404	946	101	1.44	100	64	403	928	90	1.41	100
410	3	413	1033	126	1.47	100	3	412	1067	58	1.52	100	24	413	1050	89	1.49	100
420	2	420	1025	35	1.38	100	2	421	1150	71	1.55	100	13	422	1088	85	1.46	100
430	1	437	1150	-	1.38	100	2	436	1225	35	1.48	100	6	434	1200	50	1.45	100
440	-	-	-	-	-	-	1	448	1350	-	1.50	100	3	447	1350	-	1.50	100
TOTAL	84						140						893					
MEAN		380	775	129	1.40			383	835	145	1.47			377	812	142	1.45	

October 1-7 (gillnets).

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
340	-	-	-	-	-	-	2	348	650	71	1.55	100	2	348	650	71	1.55	100
350	-	-	-	-	-	-	6	355	658	38	1.47	100	8	355	658	38	1.47	100
360	1	369	650	-	1.29	100	4	365	738	25	1.51	100	6	365	720	45	1.47	100
370	2	375	675	35	1.28	100	12	374	767	39	1.47	100	16	374	754	50	1.44	100
380	4	388	800	71	1.37	100	7	386	821	39	1.43	100	12	387	814	50	1.41	100
390	1	395	800	-	1.30	100	8	393	881	84	1.45	100	12	394	872	83	1.43	100
400	1	403	950	-	1.45	100	8	405	1025	136	1.55	100	10	405	1017	130	1.54	100
410	-	-	-	-	-	-	5	414	970	57	1.36	100	5	414	970	57	1.36	100
420	-	-	-	-	-	-	1	424	1200	-	1.57	100	1	424	1200	-	1.57	100
430	-	-	-	-	-	-	1	430	1000	-	1.26	100	1	430	1000	-	1.26	100
440	-	-	-	-	-	-	1	447	1150	-	1.29	100	1	447	1150	-	1.29	100
460	-	-	-	-	-	-	1	463	1450	-	1.46	100	1	463	1450	-	1.46	100
TOTAL	9						56						75					
MEAN		385	772	103	1.35			387	858	170	1.47			386	846	164	1.45	

Table 3. Age-frequency distribution of lake whitefish caught during different time intervals from Little Buffalo River, 1975.

August 20-26 (fish trap).

AGE	MALES							FEMALES							COMBINED						
		LENGTH(MM)		WEIGHT(G)			%		LENGTH(MM)		WEIGHT(G)			%		LENGTH(MM)		WEIGHT(G)			%
(YR)	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT
5	1	394	-	950	-	1.55	100	-	-	-	-	-	-	-	1	394	-	950	-	1.55	100
6	4	370	6.7	675	29	1.34	100	2	377	12.0	750	0	1.41	100	13	368	13.7	742	93	1.49	100
7	10	365	11.1	670	89	1.37	100	7	376	17.4	736	138	1.37	100	31	368	15.3	712	117	1.41	100
8	9	381	26.3	761	165	1.36	100	8	382	15.3	800	89	1.44	100	34	380	21.5	803	144	1.45	100
9	5	387	18.3	790	82	1.37	80	4	399	18.2	938	144	1.47	100	14	388	22.8	857	150	1.46	89
TOTAL	29							21							93						
MEAN		375	19	729	126	1.37			383	17.3	800	130	1.42			376	20.0	774	139	1.44	
MEAN AGE	7.5																				

September 3-10 (gillnets)

AGE	MALES							FEMALES							COMBINED						
		LENGTH(MM)		WEIGHT(G)			%		LENGTH(MM)		WEIGHT(G)			%		LENGTH(MM)		WEIGHT(G)			%
(YR)	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT
5	3	369	7.0	650	50	1.29	100	-	-	-	-	-	-	-	3	369	7.0	650	50	1.29	100
6	30	368	12.0	688	81	1.38	100	11	369	10.6	727	52	1.45	100	41	368	11.5	699	75	1.40	100
7	29	374	16.6	729	99	1.39	100	35	379	19.0	806	129	1.47	100	64	377	18.0	771	122	1.44	100
8	13	393	17.3	858	112	1.40	100	18	388	16.3	844	100	1.44	100	31	390	16.6	850	103	1.43	100
9	6	386	16.3	808	124	1.40	100	18	397	14.1	925	118	1.48	100	24	394	15.1	896	128	1.46	100
10	1	423	-	950	-	1.26	100	1	441	-	1300	-	1.52	100	2	432	12.7	1125	247	1.39	100
TOTAL	82							83							165						
MEAN		376	18	740	114	1.39			384	19.5	836	136	1.46			380	19.1	788	134	1.43	
MEAN AGE	7.2																				

Table 3 (cont'd).

September 17-30 (gillnets).

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
5	3	354	7.8	633	29	1.43	100	2	342	2.8	575	106	1.43	100	26	353	12.8	610	65	1.43	100
6	15	368	14.2	687	97	1.37	100	19	369	14.9	745	112	1.47	100	200	365	15.4	719	108	1.43	100
7	31	377	17.5	758	107	1.41	100	50	377	14.5	793	115	1.47	100	293	373	17.1	780	113	1.45	100
8	18	388	13.2	819	125	1.39	100	44	388	15.5	861	121	1.47	100	188	385	15.2	849	123	1.44	100
9	9	401	9.4	894	81	1.39	100	15	402	19.2	977	172	1.50	100	81	396	17.0	946	148	1.46	100
10	2	429	12.0	1075	106	1.36	100	3	409	12.8	1033	115	1.51	100	15	410	20.3	1050	100	1.45	100
11	1	388	-	850	-	1.46	100	1	415	-	1100	-	1.54	100	4	406	12.7	975	177	1.50	100
TOTAL	79							134							807						
MEAN		381	20	778	131	1.40			383	19.1	834	146	1.47			377	19.9	813	143	1.45	
MEAN AGE	7.2																				

October 1-7 (gillnets).

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
6	1	377	-	700	-	1.31	100	9	372	17.4	767	94	1.49	100	12	371	15.6	760	91	1.47	100
7	4	389	4.2	813	63	1.38	100	17	376	20.4	791	143	1.48	100	25	378	18.8	795	130	1.46	100
8	2	379	13.4	700	71	1.29	100	18	392	20.6	875	151	1.44	100	24	391	18.9	858	153	1.43	100
9	1	403	-	950	-	1.45	100	8	407	11.3	1000	110	1.48	100	9	407	10.7	994	104	1.48	100
10	-	-	-	-	-	-	-	1	418	-	950	-	1.30	100	1	418	-	950	-	1.30	100
13	-	-	-	-	-	-	-	1	463	-	1450	-	1.46	100	1	463	-	1450	-	1.46	100
TOTAL	8							54							72						
MEAN		387	10	788	99	1.36			388	24.5	861	171	1.47			387	22.6	852	164	1.45	
MEAN AGE	7.5																				

Table 4. Frequency, by maturity stage, of lake whitefish caught in the Little Buffalo River, 1975 and 1977.

		Mature		Ripe		Spent	
Year	Day/Month	Female	Male	Female	Male	Female	Male
1975	20/08	-	1	-	-	-	-
	21/08	12	8	-	-	-	-
	23/08	3	7	-	-	-	-
	24/08	4	5	-	-	-	-
	25/08	2	7	-	-	-	-
	03/09	5	7	-	-	-	-
	04/09	6	8	-	-	-	-
	05/09	8	8	-	-	-	-
	06/09	33	18	-	-	-	-
	08/09	15	30	-	-	-	-
	09/09	10	5	-	-	-	-
	10/09	7	8	-	-	-	-
	17/09	20	21	-	-	-	-
	19/09	19	15	-	-	-	-
	20/09	6	3	-	-	-	-
	21/09	1	1	-	-	-	-
	22/09	14	4	-	-	-	-
	23/09	3	3	-	-	-	-
	24/09	3	1	-	-	-	-
	25/09	10	5	-	-	-	-
	26/09	10	4	-	-	-	-
	27/09	6	4	-	1	-	-
	28/09	4	1	-	-	-	-
	29/09	-	1	4	2	-	-
	30/09	29	7	8	4	-	6
	02/10	8	3	-	-	-	-
	03/10	5	4	1	-	-	-
	04/10	7	-	1	-	-	-
	05/10	5	2	5	-	2	-
	06/10	7	-	2	-	2	-
	07/10	5	-	4	-	2	-
Total		265	182	27	16	6	6
1977	20/09	17	12	-	-	-	-
	21/09	-	-	8	1	-	-
	22/09	-	-	9	11	-	-
Total		17	12	17	12	-	-

Table 5. Recapture summary for lake whitefish tagged at Little Buffalo River, 21 August to 7 October, 1975.

Recapture Location	Date of Recapture	No. of Fish	Mean no. of Days at Liberty	Distance Travelled (km)
Little Buffalo River (tagging site)	Sept. 1975	47	3	0
	Oct. 1975	5	18	0
Little Buffalo River (village)	Oct. 1975	11	12	19
	Oct. 1976	21	384	19
	May 1977	1	595	19
	Sept. 1977	4	716	19
	Oct. 1977	158	751	19
	Oct. 1978	2	1111	19
	Nov. 1978	6	1147	19
	Sept. 1979	6	1458	19
	Oct. 1979	5	1483	19
	Sept. 1980	1	1811	19
	Sept. 1981	1	2165	19
Resolution Bay (Round Island)	Oct. 1975	2	16	35
	Nov. 1975	1	67	35
	Jan. 1976	3	113	35
	Feb. 1976	2	131	35
	Sept. 1976	2	349	35
	Oct. 1976	4	386	35
	Dec. 1976	3	455	35
	June 1977	2	630	35
	Sept. 1977	1	736	35
	Nov. 1977	1	781	35
	Dec. 1977	1	821	35
	Oct. 1978	3	1116	35
Dawson's Landing	Oct. 1975	1	17	3
	Sept. 1979	1	1460	31
Sulphur Point	July 1976	4	306	70

Table 6. Recapture summary for lake whitefish tagged at Little Buffalo River, 20-22 September, 1977.

Recapture Location	Date of Recapture	No. of Fish	Mean No. of Days at Liberty	Distance Travelled (km)
Little Buffalo River (village)	Oct. 6/77	18	16	19
	Oct. 12/77	44	22	19
	Oct. 15/77	38	25	19
	Oct. 20/77	11	30	19

Table 7. Biological data by length interval for lake whitefish , Little Buffalo River, 1975.

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
310	-	-	-	-	-	-	-	-	-	-	-	-	3	317	-	-	-	-
320	-	-	-	-	-	-	-	-	-	-	-	-	7	324	-	-	-	-
330	2	337	475	35	1.25	100	2	337	550	71	1.44	100	32	335	543	67	1.42	100
340	8	345	619	37	1.51	100	8	346	619	59	1.50	100	94	345	624	45	1.51	100
350	25	355	620	46	1.38	100	22	356	670	57	1.49	100	178	355	642	57	1.43	100
360	33	365	671	45	1.37	100	37	365	716	50	1.47	100	252	365	702	60	1.44	100
370	45	374	717	48	1.37	100	57	374	762	53	1.45	100	270	374	746	64	1.42	100
380	42	384	800	59	1.41	98	56	384	831	65	1.46	100	255	384	822	65	1.45	99
390	20	394	838	60	1.37	100	61	393	898	84	1.47	100	189	394	886	84	1.45	100
400	21	403	902	51	1.38	100	31	404	969	101	1.47	100	104	404	944	90	1.43	100
410	4	413	1000	122	1.42	100	13	413	996	63	1.41	100	47	413	1000	73	1.42	100
420	5	422	1020	45	1.36	100	6	423	1142	92	1.51	100	26	423	1082	103	1.43	100
430	1	437	1150	-	1.38	100	4	433	1150	108	1.41	100	8	434	1150	94	1.41	100
440	-	-	-	-	-	-	3	445	1267	104	1.43	100	5	446	1267	104	1.43	100
460	-	-	-	-	-	-	1	463	1450	-	1.46	100	1	463	1450	-	1.46	100
TOTAL	206						301						1471					
MEAN		378	754	122	1.39			384	836	147	1.47			376	802	144	1.44	

Table 8. Biological data by length interval for lake whitefish caught by gillnets (114mm mesh), Little Buffalo River, 1975.

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
330	-	-	-	-	-	-	1	334	500	-	1.34	100	5	335	500	-	1.34	100
340	1	345	650	-	1.58	100	5	347	640	42	1.53	100	26	346	642	38	1.54	100
350	9	357	644	30	1.42	100	13	356	681	43	1.51	100	79	355	666	42	1.47	100
360	9	366	667	50	1.36	100	14	365	718	54	1.48	100	115	365	698	57	1.43	100
370	14	373	718	42	1.38	100	36	374	772	50	1.47	100	157	374	757	53	1.45	100
380	20	384	810	58	1.43	100	29	385	847	64	1.49	100	154	384	832	63	1.46	100
390	11	394	823	61	1.34	100	34	394	903	94	1.48	100	111	394	883	93	1.44	100
400	10	403	905	64	1.38	100	20	404	993	109	1.50	100	66	404	963	104	1.46	100
410	3	413	1033	126	1.47	100	8	414	1006	73	1.42	100	27	413	1014	84	1.43	100
420	2	420	1025	35	1.38	100	3	422	1167	58	1.56	100	13	422	1110	89	1.49	100
430	1	437	1150	-	1.38	100	3	434	1150	132	1.41	100	7	434	1150	108	1.40	100
440	-	-	-	-	-	-	2	448	1250	141	1.39	100	4	447	1250	141	1.39	100
460	-	-	-	-	-	-	1	463	1450	-	1.46	100	1	463	1450	-	1.46	100
TOTAL	80						169						765					
MEAN		383	789	124	1.40			385	855	154	1.48			380	834	148	1.45	

Table 9. Biological data by length interval for lake whitefish caught by gillnets (114mm mesh), Little Buffalo River, 1977.

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
330	-	-	-	-	-	-	-	-	-	-	-	-	1	337	-	-	-	-
340	-	-	-	-	-	-	-	-	-	-	-	-	2	345	-	-	-	-
350	-	-	-	-	-	-	1	358	700	-	1.53	100	9	356	700	-	1.53	100
360	2	363	625	0	1.31	100	-	-	-	-	-	-	22	364	625	0	1.31	100
370	5	375	695	27	1.31	100	1	376	700	-	1.32	100	44	374	696	25	1.31	100
380	2	385	738	18	1.30	100	-	-	-	-	-	-	36	384	738	18	1.30	100
390	2	390	838	88	1.41	100	6	394	875	69	1.43	100	54	394	866	69	1.43	100
400	2	400	850	35	1.33	100	4	403	944	72	1.44	100	25	403	913	75	1.40	100
410	-	-	-	-	-	-	2	413	1025	35	1.46	100	23	414	1025	35	1.46	100
420	-	-	-	-	-	-	1	422	1025	-	1.36	100	7	424	1025	-	1.36	100
430	-	-	-	-	-	-	-	-	-	-	-	-	3	435	-	-	-	-
440	-	-	-	-	-	-	-	-	-	-	-	-	2	445	-	-	-	-
450	-	-	-	-	-	-	1	452	1400	-	1.52	100	1	452	1400	-	1.52	100
TOTAL	13						16						229					
MEAN		381	737	88	1.33			401	931	166	1.44			389	844	167	1.39	

Table 10. Biological data by age group for lake whitefish, Little Buffalo River, 1975.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
5	7	366	15.6	686	121	1.39	100	2	342	2.8	575	106	1.43	100	39	354	14.4	661	122	1.40	100
6	50	368	12.1	687	81	1.37	100	41	370	14.0	745	91	1.47	100	341	364	15.8	718	93	1.43	100
7	74	375	16.5	738	104	1.40	100	109	377	17.0	793	125	1.47	100	487	373	17.8	768	120	1.44	100
8	42	388	18.0	813	132	1.38	100	88	388	16.7	855	121	1.45	100	314	385	16.8	840	129	1.44	100
9	21	393	15.2	848	103	1.39	95	45	400	15.9	957	138	1.49	100	141	396	17.1	918	141	1.46	98
10	3	427	9.1	1033	104	1.33	100	5	417	16.5	1070	157	1.47	100	20	413	18.9	1056	132	1.41	100
11	1	388	-	850	-	1.46	100	1	415	-	1100	-	1.54	100	6	401	13.2	975	177	1.50	100
13	-	-	-	-	-	-	-	1	463	-	1450	-	1.46	100	1	463	-	1450	-	1.46	100
TOTAL	198							292							1349						
MEAN		378	19	756	123	1.39			384	20.2	837	147	1.47			376	20.8	803	144	1.44	
MEAN AGE	7.5							7.5							7.2						

Table 11. Biological data by age group for lake whitefish caught by gillnets (114mm mesh), Little Buffalo River, 1975.

AGE	MALES							FEMALES							COMBINED						
		LENGTH(MM)		WEIGHT(G)			%		LENGTH(MM)		WEIGHT(G)			%		LENGTH(MM)		WEIGHT(G)			%
(YR)	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT
5	3	354	7.8	633	29	1.43	100	1	344	-	650	-	1.60	100	17	357	12.9	638	25	1.47	100
6	12	371	11.3	708	79	1.38	100	26	370	15.9	752	108	1.48	100	154	368	14.2	738	101	1.45	100
7	28	382	16.3	784	103	1.41	100	54	377	16.0	804	122	1.49	100	237	377	16.3	797	115	1.46	100
8	19	388	13.6	811	128	1.38	100	55	390	17.4	875	131	1.47	100	186	386	16.1	859	133	1.45	100
9	9	401	9.4	900	83	1.39	100	20	405	16.9	1005	151	1.50	100	80	398	16.9	972	141	1.47	100
10	2	429	12.0	1075	106	1.36	100	4	411	11.4	1013	103	1.45	100	15	412	19.7	1033	98	1.42	100
11	1	388	-	850	-	1.46	100	1	415	-	1100	-	1.54	100	3	403	13.9	975	177	1.50	100
13	-	-	-	-	-	-	-	1	463	-	1450	-	1.46	100	1	463	-	1450	-	1.46	100
TOTAL	74							162							693						
MEAN		384	18	795	126	1.40			385	21.1	855	156	1.48			380	19.4	836	149	1.45	
MEAN AGE		7.5							7.5							7.3					

Table 12. Biological data by age group for lake whitefish caught by gillnets (114mm mesh), Little Buffalo River, 1977.

AGE	MALES							FEMALES							COMBINED						
		LENGTH(MM)		WEIGHT(G)			%		LENGTH(MM)		WEIGHT(G)			%		LENGTH(MM)		WEIGHT(G)			%
(YR)	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT	N	MEAN	SD	MEAN	SD	K	MAT
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	383	-	-	-	-	-
7	1	390	-	775	-	1.31	100	-	-	-	-	-	-	-	32	374	15.9	775	-	1.31	100
8	6	374	10.0	679	53	1.30	100	4	385	18.0	825	104	1.45	100	77	383	16.5	738	104	1.36	100
9	6	387	11.6	788	90	1.36	100	5	392	10.0	850	100	1.40	100	73	391	16.0	816	96	1.38	100
10	-	-	-	-	-	-	-	2	409	9.9	1025	35	1.50	100	16	406	13.1	1025	35	1.50	100
11	-	-	-	-	-	-	-	2	416	8.5	1038	18	1.44	100	11	413	19.4	1038	18	1.44	100
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	417	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	425	17.7	-	-	-	-
TOTAL	13							13							213						
MEAN		381	12	737	88	1.33			396	16.5	898	122	1.44			388	19.2	817	133	1.38	
MEAN AGE		9.2							9.2							8.6					

Table 13. Fecundity of lake whitefish from Little Buffalo River, 1975.

No.	Fork Length (mm)	Round Weight (g)	Age (yr)	Number of Ova		
				Right Ovary	Left Ovary	Total
1	369	700	7	7 430	6 130	13 560
2	411	1 000	9	13 099	14 501	27 600
3	391	900	9	10 272	9 200	19 472
4	339	600	7	5 883	5 824	11 707
5	374	800	9	4 901	6 451	11 352
6	427	1 000	8	18 352	8 740	27 092
7	409	900	8	11 991	4 351	16 342
8	404	1 000	8	10 084	10 130	20 214
9	364	750	6	7 953	8 944	16 897
10	397	900	8	7 680	8 615	16 295
11	398	900	7	8 754	14 202	22 956
12	402	900	8	5 744	6 499	12 243
13	372	775	7	10 108	3 380	13 488
14	401	850	8	6 864	7 385	14 249
15	441	950	10	11 935	21 405	33 340
16	387	950	8	7 989	8 785	16 774
17	368	900	8	8 742	6 914	15 480
18	385	850	7	5 742	7 616	13 358
19	402	775	8	23 898	9 963	33 861
20	385	750	-	9 739	8 841	18 580
Mean	391	858	7.9	9 849	8 894	18 743

Table 14. Instantaneous total mortality rate (Z) for each fish species caught in Little Buffalo River, 1975 and 1977.

Species	Age-Classes Used	Total Instantaneous Mortality Rate (Z)	Annual Mortality Rate (A)	Survival Rate (S)
Lake whitefish				
1975 (gillnets)	8-11	1.42	0.76	0.24
(all gear)	8-11	1.38	0.75	0.25
1977 (gillnets)	9-12	0.97	0.62	0.38
Northern pike				
1975	8-10	0.63	0.47	0.53
Walleye 1975	12-14	1.20	0.70	0.30

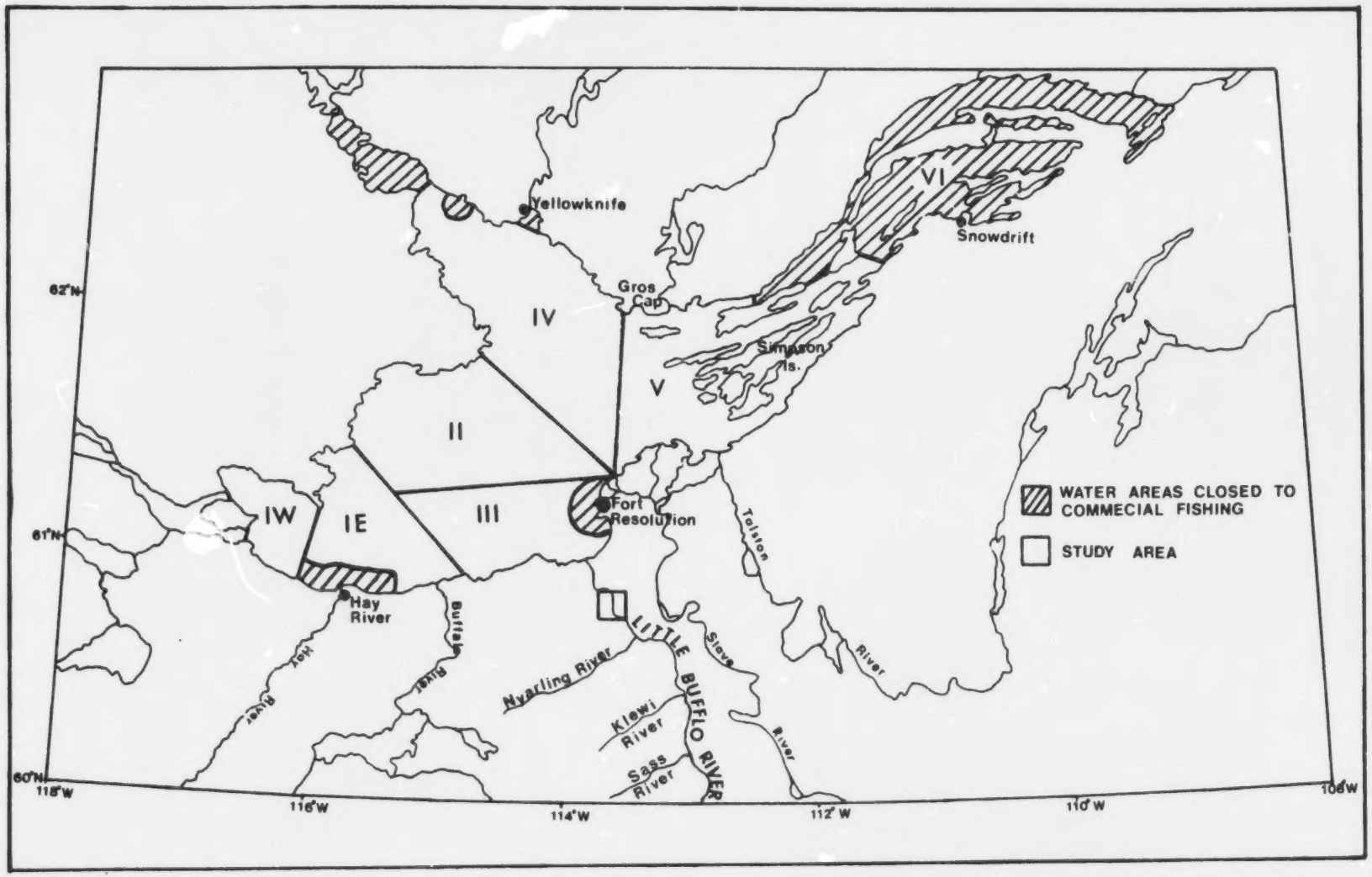


Fig. 1. Map of Great Slave Lake showing the location of Little Buffalo River study area and the administrative areas for commercial fishing.

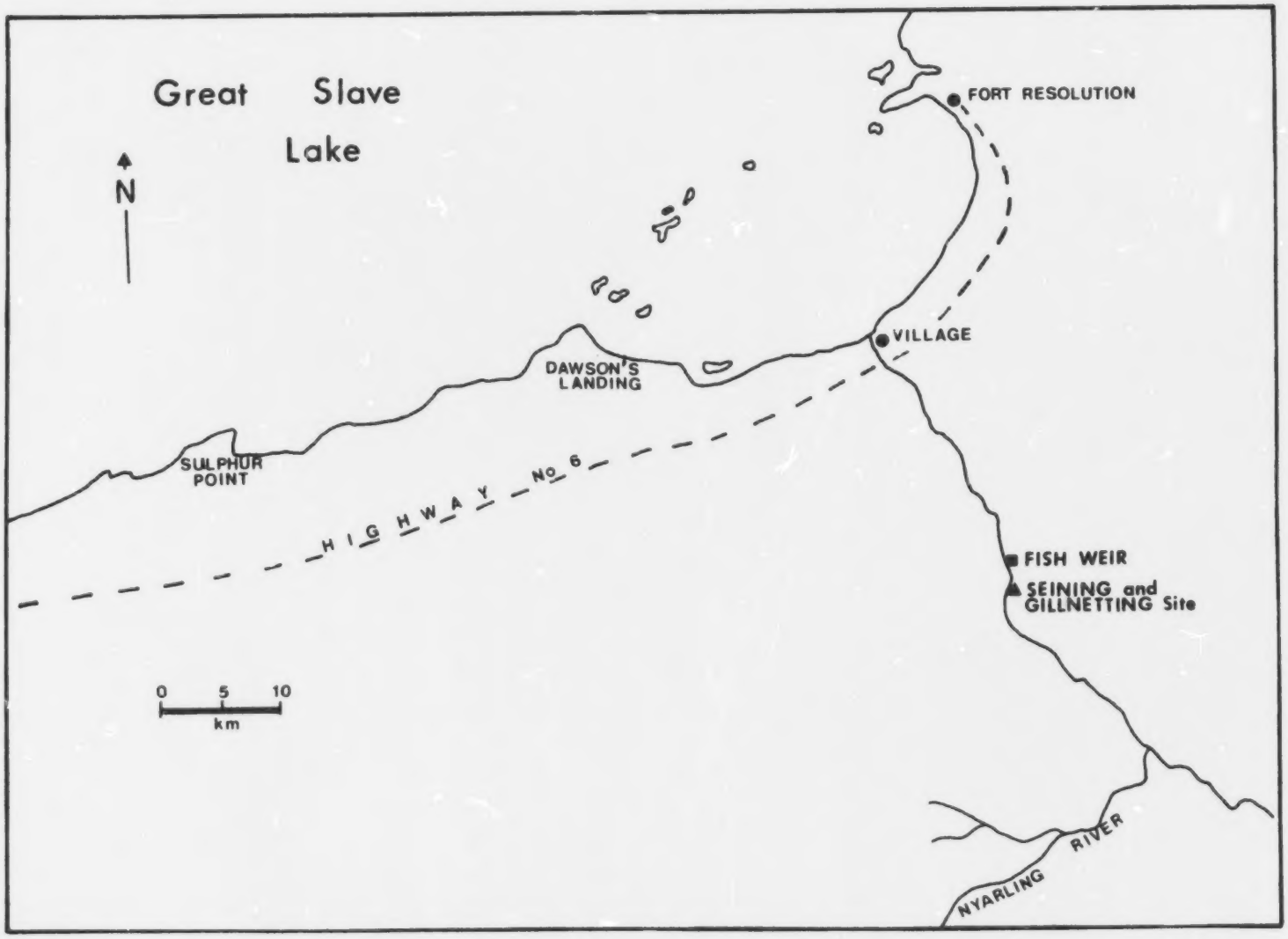


Fig. 2. Map of Little Buffalo River study area showing the locations of the fish weir, seining and gillnetting sites.

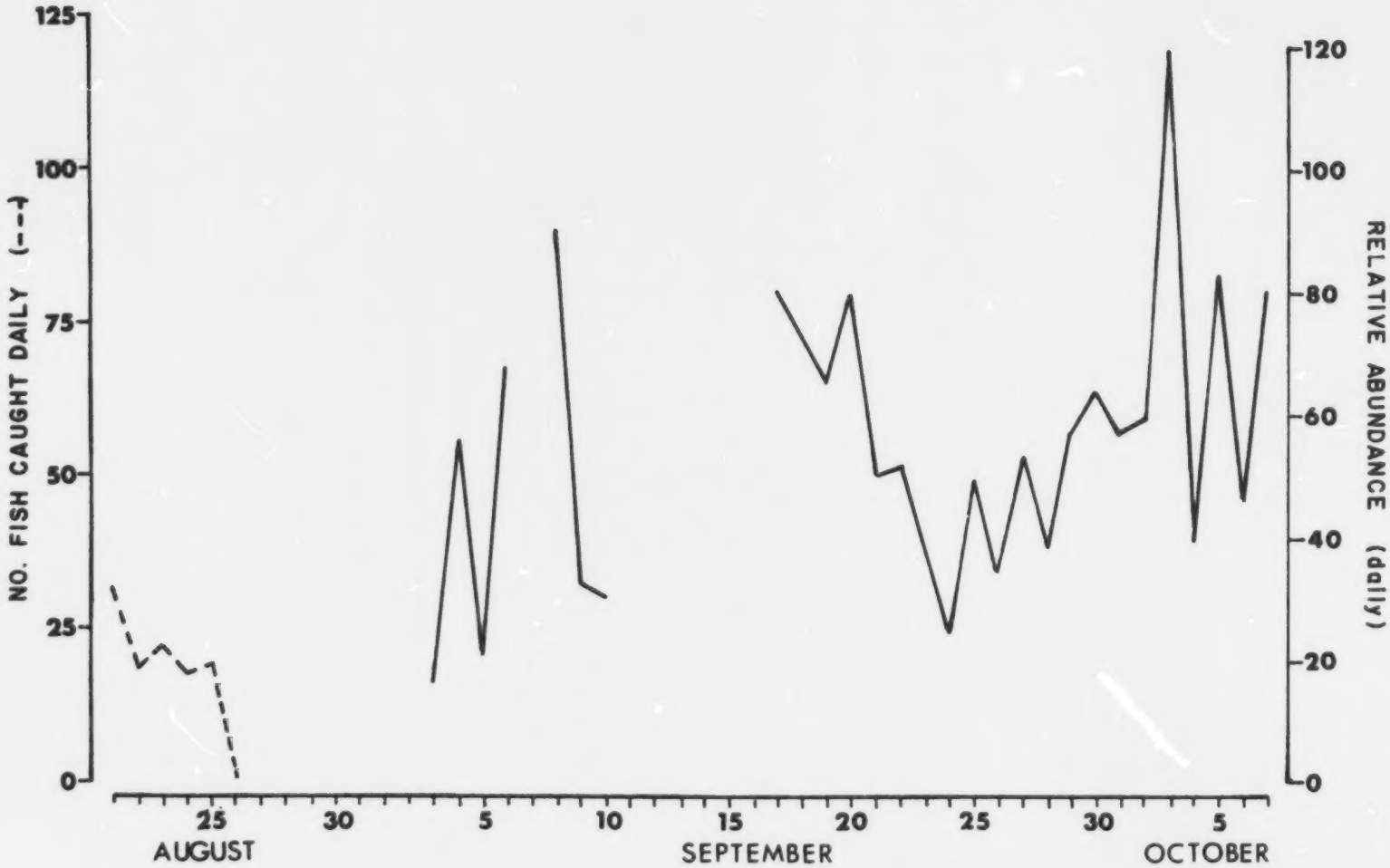
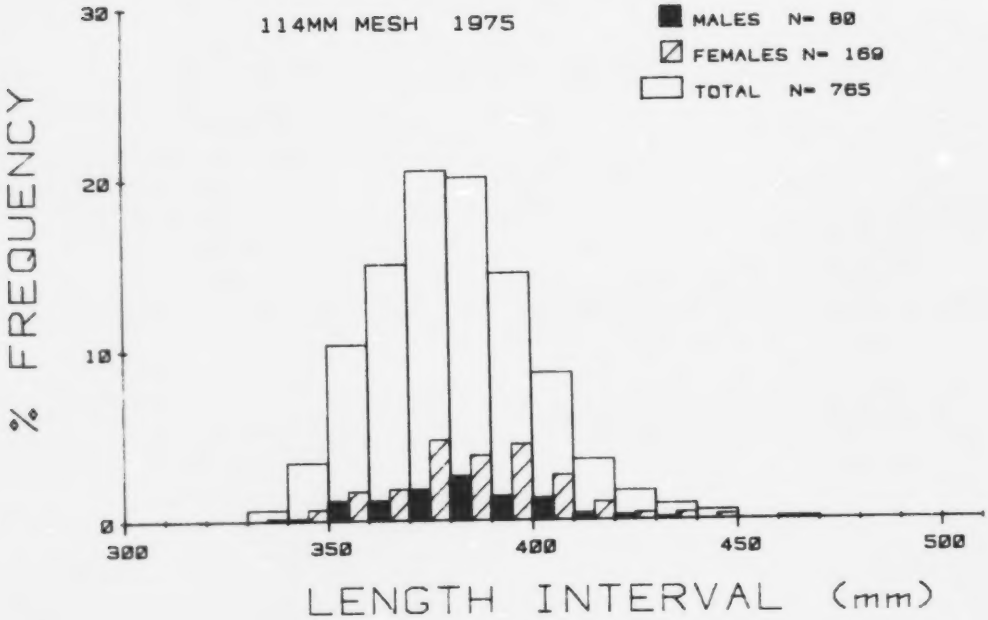


Fig. 3. Relative abundance (no. of fish caught/45.7 m net/24 h) of lake whitefish caught in Little Buffalo River, 20 August to 7 October 1975.



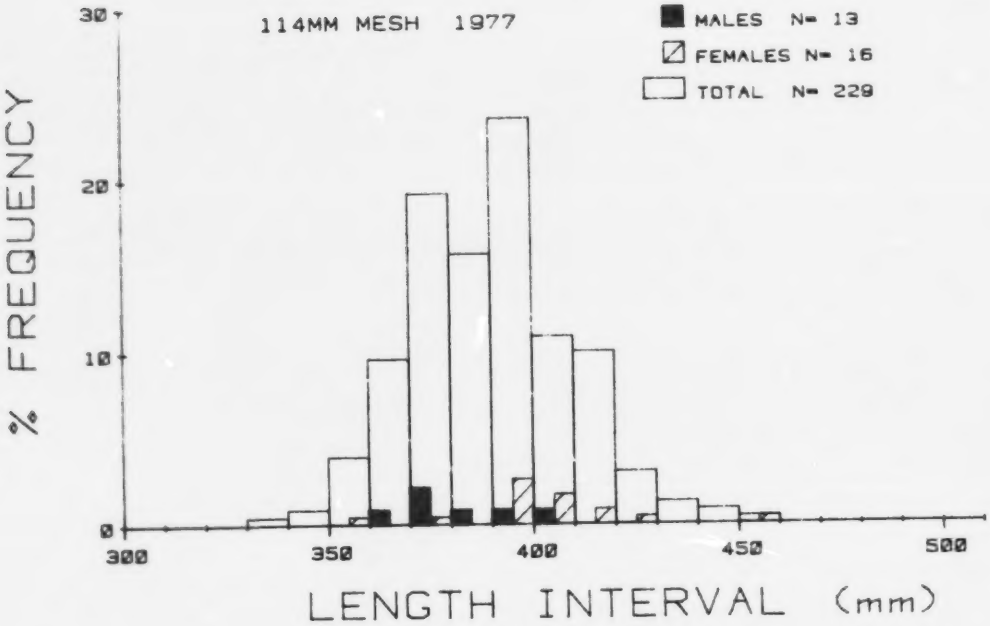
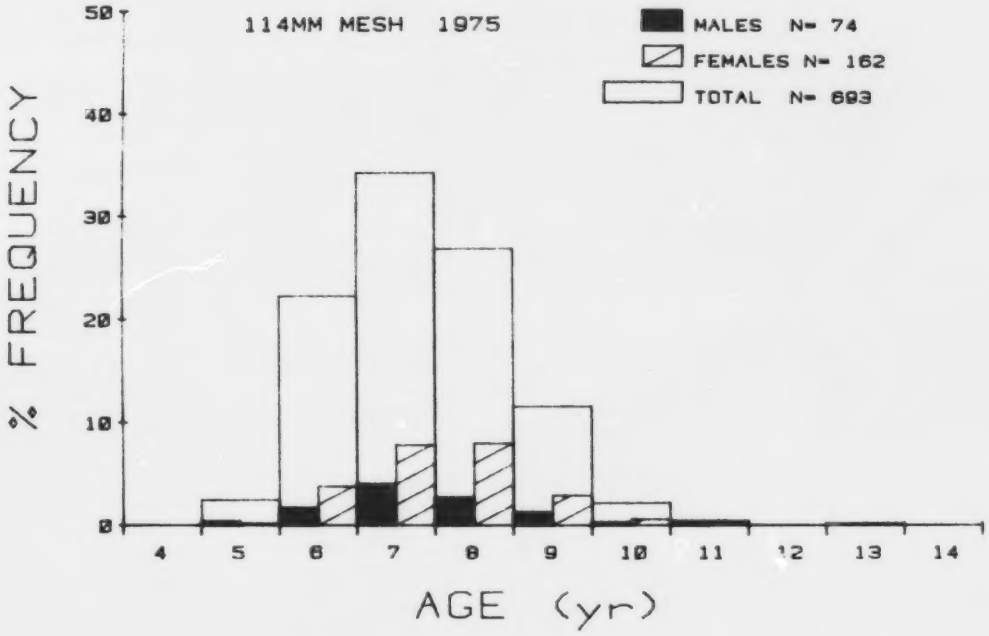


Fig. 4. Length-frequency histograms for lake whitefish caught in Little Buffalo River, 1975 and 1977.



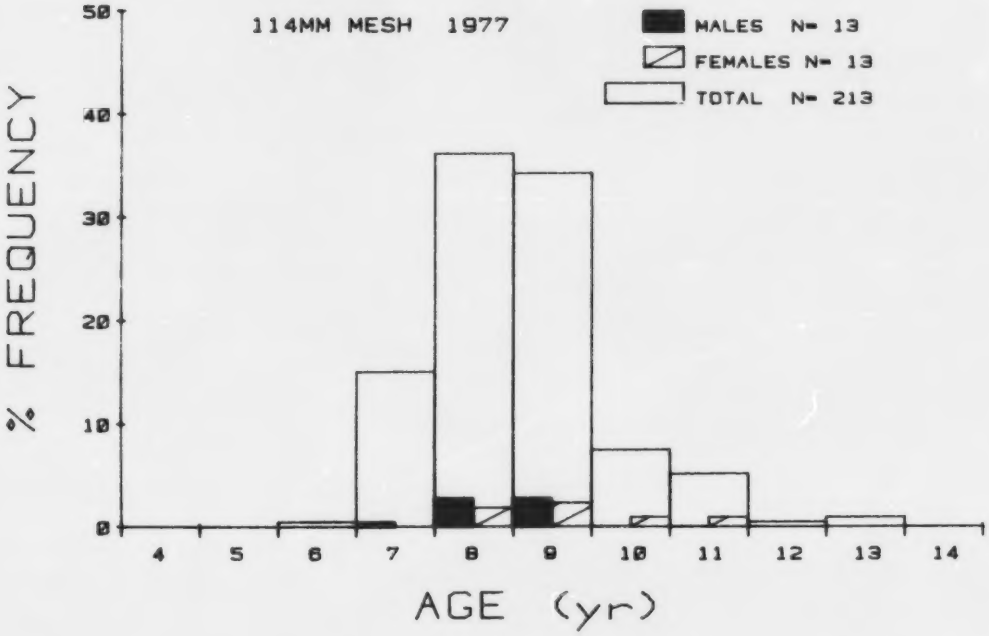
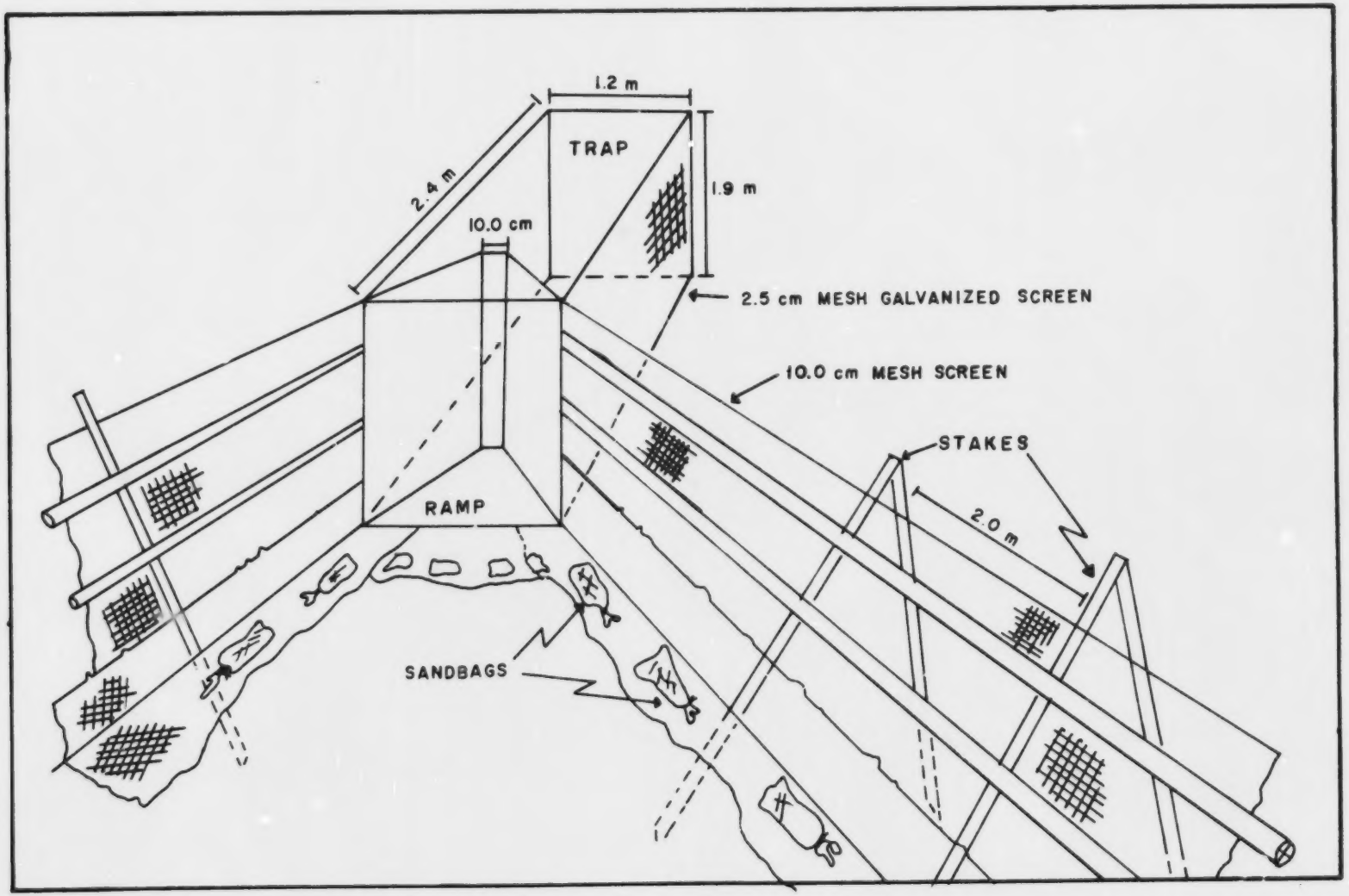


Fig. 5. Age-frequency histograms for lake whitefish caught in Little Buffalo River, 1975 and 1977.



Appendix 1. Diagram of the fish weir used in Little Buffalo River, 1975.

Appendix 2. Percent occurrence of various food types found in the stomachs of lake whitefish, northern pike and yellow walleye examined from Little Buffalo River, 1975.

Species	Number Fish	Number Fish Feeding	Food Type									
			Fish remains		Benthic Invertebrates		Vegetation		Fish Eggs		Unidentified Remains	
			No.	%	No.	%	No.	%	No.	%	No.	%
Lake Whitefish	513	139	1	0.7	127	91.4	1	0.7	6	4.3	4	2.9
Northern Pike	72	22	20	90.9	-	-	-	-	-	-	2	9.1
Yellow Walleye	109	23	23	100.0	-	-	-	-	-	-	-	-

Appendix 3. Biological data by length interval for lake whitefish caught in traps, Little Buffalo River, 1975.

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
330	1	334	450	-	1.21	100	-	-	-	-	-	-	4	336	550	82	1.45	100
340	1	345	550	-	1.34	100	-	-	-	-	-	-	4	347	625	50	1.50	100
350	4	355	588	25	1.31	100	2	355	600	71	1.34	100	13	355	608	51	1.37	100
360	6	366	692	38	1.41	100	4	367	700	71	1.41	100	21	366	724	72	1.48	100
370	7	375	714	48	1.36	100	3	375	750	0	1.42	100	21	374	752	91	1.44	100
380	3	385	800	50	1.40	67	5	383	790	55	1.40	100	18	384	831	62	1.47	88
390	2	392	900	71	1.49	100	3	392	900	50	1.49	100	8	393	931	70	1.53	100
400	4	404	888	48	1.35	100	3	404	933	29	1.41	100	9	404	928	62	1.41	100
410	1	412	900	-	1.29	100	-	-	-	-	-	-	3	414	983	76	1.39	100
420	-	-	-	-	-	-	1	422	1100	-	1.46	100	4	424	1075	126	1.41	100
TOTAL	29						21						105					
MEAN		375	729	126	1.37			383	800	130	1.42			376	779	145	1.45	

Appendix 4. Biological data by age group for lake whitefish caught in traps, Little Buffalo River, 1975.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
5	1	394	-	950	-	1.55	100	-	-	-	-	-	-	-	1	394	-	950	-	1.55	100
6	4	370	6.7	675	29	1.34	100	2	377	12.0	750	0	1.41	100	13	368	13.7	742	93	1.49	100
7	10	365	11.1	670	89	1.37	100	7	376	17.4	736	138	1.37	100	31	368	15.3	712	117	1.41	100
8	9	381	26.3	761	165	1.36	100	8	382	15.3	800	89	1.44	100	34	380	21.5	803	144	1.45	100
9	5	387	18.3	790	82	1.37	80	4	399	18.2	938	144	1.47	100	14	388	22.8	857	150	1.46	89
TOTAL	29							21							93						
MEAN		375	19	729	126	1.37			383	17.3	800	130	1.42			376	20.0	774	139	1.44	
MEAN AGE		7.7							7.7							7.5					

Appendix 5. Biological data by length interval for lake whitefish caught by seine nets, Little Buffalo River, 1975.

LENGTH INTERVAL (MM)	NO.	PERCENT	MEAN FORK LENGTH(MM)	DRESSED WEIGHT(G) MEAN	DRESSED WEIGHT(G) SD
310	1	0	315	-	-
320	4	2	324	-	-
330	12	5	334	-	-
340	34	15	345	-	-
350	36	16	355	-	-
360	43	19	364	-	-
370	25	11	375	-	-
380	31	13	385	-	-
390	23	10	394	-	-
400	8	3	403	-	-
410	10	4	414	-	-
420	3	1	422	-	-
TOTAL	230				
MEAN			368	-	-

Appendix 6. Biological data by age group for lake whitefish caught by seine nets, Little Buffalo River, 1975.

AGE (YR)	NO.	PERCENT	FORK LENGTH(MM) MEAN	FORK LENGTH(MM) SD	DRESSED WEIGHT(G) MEAN	DRESSED WEIGHT(G) SD
5	9	4	351	13	-	-
6	75	35	355	17	-	-
7	74	35	369	20	-	-
8	37	17	385	17	-	-
9	13	6	400	15	-	-
10	2	1	415	0.7	-	-
11	2	1	391	8.5	-	-
TOTAL	212					
MEAN			369	23	-	-
MEAN AGE	6.9					

Appendix 7. Biological data by length interval for lake whitefish caught by gillnets (108 & 114mm mesh), Little Buffalo River, 1975

LENGTH INTERVAL (MM)	MALES N	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
310	-	-	-	-	-	-	-	-	-	-	-	-	2	319	-	-	-	-
320	-	-	-	-	-	-	-	-	-	-	-	-	3	324	-	-	-	-
330	1	339	500	-	1.28	100	2	337	550	71	1.44	100	16	336	533	58	1.39	100
340	7	345	629	27	1.54	100	8	346	619	59	1.50	100	56	345	623	46	1.52	100
350	21	355	626	46	1.40	100	20	356	678	53	1.50	100	129	355	651	55	1.45	100
360	27	365	667	46	1.37	100	33	365	718	48	1.48	100	188	365	695	53	1.43	100
370	38	374	717	48	1.37	100	54	374	763	54	1.45	100	224	374	744	56	1.42	100
380	39	384	800	61	1.41	100	51	384	835	65	1.47	100	206	384	820	65	1.45	100
390	18	394	831	57	1.36	100	58	393	897	86	1.47	100	158	394	882	85	1.45	100
400	17	403	906	53	1.38	100	28	404	973	106	1.47	100	87	404	948	95	1.44	100
410	3	413	1033	126	1.47	100	13	413	996	63	1.41	100	34	413	1003	74	1.42	100
420	5	422	1020	45	1.36	100	5	423	1150	100	1.52	100	19	423	1085	100	1.44	100
430	1	437	1150	-	1.38	100	4	433	1150	108	1.41	100	8	434	1150	94	1.41	100
440	-	-	-	-	-	-	3	445	1267	104	1.43	100	5	446	1267	104	1.43	100
460	-	-	-	-	-	-	1	463	1450	-	1.46	100	1	463	1450	-	1.46	100
TOTAL	177						280						1136					
MEAN		379	758	121	1.39			384	839	148	1.47			378	808	143	1.44	

Appendix 8. Biological data by age class for lake whitefish caught by gillnets (108 & 114mm mesh), Little Buffalo River, 1975.

AGE (YR)	MALES N	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	MALES % MAT	FEMALES N	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	FEMALES % MAT	COMBINED N	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	COMBINED % MAT
5	6	362	10.7	642	38	1.36	100	2	342	2.8	575	106	1.43	100	29	354	13.3	625	60	1.38	100
6	46	368	12.5	688	84	1.38	100	39	370	14.1	745	93	1.47	100	253	366	14.8	714	92	1.42	100
7	64	376	16.8	748	102	1.40	100	102	377	17.1	797	124	1.47	100	382	374	17.4	778	118	1.45	100
8	33	390	15.0	827	121	1.39	100	80	389	16.8	861	123	1.46	100	243	386	15.9	851	123	1.44	100
9	16	395	14.1	866	104	1.40	100	41	400	15.9	959	139	1.49	100	114	397	16.4	932	136	1.46	100
10	3	427	9.1	1033	104	1.33	100	5	417	16.5	1070	157	1.47	100	18	413	19.9	1056	132	1.41	100
11	1	388	-	850	-	1.46	100	1	415	-	1100	-	1.54	100	4	406	12.7	975	177	1.50	100
13	-	-	-	-	-	-	-	1	463	-	1450	-	1.46	100	1	463	-	1450	-	1.46	100
TOTAL	169							271							1044						
MEAN		379	19	760	123	1.39			384	20.4	840	148	1.47			378	20.1	809	144	1.44	
MEAN AGE		7.5							7.5							7.2					

Appendix 9. Biological data by length interval for northern pike caught by gillnets from Little Buffalo River, 1975.

LENGTH INTERVAL (MM)	MALES N	MALES %	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	FEMALES N	FEMALES %	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	COMBINED N	COMBINED %	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	% FEMALE
500	3	10	514	1083	153	0.80	2	6	506	1150	354	0.89	5	8	511	1110	210	0.84	40
520	1	3	521	950	-	0.67	1	3	533	1050	-	0.69	2	3	527	1000	71	0.68	50
540	3	10	550	1250	100	0.75	2	6	552	1225	177	0.73	5	8	551	1240	114	0.74	40
560	4	13	568	1388	118	0.76	2	6	568	1300	212	0.71	6	9	568	1358	139	0.74	33
580	2	7	588	1475	35	0.73	3	8	586	1483	144	0.74	5	8	587	1480	104	0.73	60
600	5	17	612	1730	225	0.76	5	14	608	1620	97	0.72	10	15	610	1675	174	0.74	50
620	5	17	631	1890	152	0.75	3	8	630	1850	50	0.74	8	12	631	1875	120	0.75	38
640	4	13	652	2013	350	0.72	2	6	658	1975	35	0.69	6	9	654	2000	272	0.71	33
660	2	7	672	2050	354	0.67	2	6	663	2250	141	0.77	4	6	667	2150	248	0.72	50
680	-	-	-	-	-	-	3	8	686	2400	229	0.74	3	5	686	2400	229	0.74	-
700	-	-	-	-	-	-	2	6	713	2625	460	0.73	2	3	713	2625	460	0.73	-
720	-	-	-	-	-	-	4	11	722	3013	170	0.80	4	6	722	3013	170	0.80	-
740	-	-	-	-	-	-	2	6	746	3450	141	0.83	2	3	746	3450	141	0.83	-
760	1	3	779	3950	-	0.84	1	3	763	3600	-	0.81	2	3	771	3775	247	0.82	50
800	-	-	-	-	-	-	1	3	800	5100	-	1.00	1	2	800	5100	-	1.00	-
820	-	-	-	-	-	-	1	3	820	5100	-	0.92	1	2	820	5100	-	0.92	-
TOTAL	30						36						66						
MEAN			603	1688	575	0.75			649	2226	1021	0.77			628	1982	884	0.76	55

Appendix 10. Biological data by age group for northern pike caught by gillnets from Little Buffalo River, 1975.

AGE (YR)	MALES K	MALES %	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	FEMALES N	FEMALES %	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	COMBINED N	COMBINED %	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	% FEMALE
4	4	14	522	15.1	1100	129	0.78	5	15	534	31.2	1220	301	0.80	9	15	529	24.8	1167	236	0.79	56
5	1	4	580	-	1500	-	0.77	9	26	616	55.5	1700	558	0.71	10	16	613	53.6	1680	530	0.71	90
6	6	21	575	46.3	1417	333	0.74	5	15	622	36.7	1840	347	0.76	11	18	597	47.1	1609	390	0.75	45
7	10	36	618	30.6	1745	330	0.74	7	21	684	65.2	2579	877	0.78	17	27	645	57.1	2088	727	0.75	41
8	2	7	647	45.3	2175	177	0.81	5	15	726	58.6	3170	1161	0.80	7	11	704	64.3	2886	1068	0.80	71
9	2	7	619	16.3	1675	177	0.71	2	6	742	82.0	3875	1732	0.91	4	6	680	86.1	2775	1620	0.81	50
10	2	7	642	32.5	1825	35	0.70	-	-	-	-	-	-	-	2	3	642	32.5	1825	35	0.70	-
11	1	4	655	-	2200	-	0.78	1	3	690	-	2350	-	0.72	2	3	673	24.7	2275	106	0.75	50
TOTAL	28							34							62							
MEAN			599	40.7	1621	394	0.74			645	80.9	2194	1036	0.77			624	71.9	1935	855	0.76	55
MEAN AGE	6.5																					

Appendix 11. Biological data by length interval for yellow walleye caught by gillnets from Little Buffalo River, 1975.

LENGTH INTERVAL (MM)	MALES N	MALES %	MALES LENGTH(MM) MEAN	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	FEMALES N	FEMALES %	FEMALES LENGTH(MM) MEAN	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	COMBINED N	COMBINED %	COMBINED LENGTH(MM) MEAN	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	% FEMALE
380	1	1	388	650	-	1.11	-	-	-	-	-	-	1	1	388	650	-	1.11	-
390	4	4	395	800	41	1.30	-	-	-	-	-	-	4	4	395	800	41	1.30	-
400	4	4	405	750	0	1.13	-	-	-	-	-	-	4	4	405	750	0	1.13	-
410	3	3	411	883	58	1.27	-	-	-	-	-	-	3	3	411	883	58	1.27	-
420	4	4	425	963	48	1.25	1	10	425	950	-	1.24	5	5	425	960	42	1.25	20
430	6	6	436	1042	74	1.26	-	-	-	-	-	-	6	5	436	1042	74	1.26	-
440	7	7	444	1129	64	1.29	-	-	-	-	-	-	7	6	444	1129	64	1.29	-
450	18	19	455	1183	66	1.26	2	20	451	1225	106	1.34	20	18	455	1188	69	1.26	10
460	9	9	464	1228	75	1.23	1	10	469	1400	-	1.36	10	9	464	1245	90	1.24	10
470	19	20	474	1308	79	1.23	2	20	474	1375	35	1.29	22	20	475	1316	76	1.23	10
480	5	5	486	1380	57	1.20	-	-	-	-	-	-	6	5	486	1392	58	1.22	-
490	8	8	493	1456	68	1.22	1	10	495	1650	-	1.36	10	9	493	1475	86	1.23	11
500	4	4	502	1588	111	1.25	1	10	500	1650	-	1.32	5	5	502	1600	100	1.27	20
510	2	2	515	1750	0	1.28	1	10	515	1650	-	1.21	4	4	515	1725	50	1.26	33
520	1	1	520	1850	-	1.32	1	10	525	2050	-	1.42	2	2	523	1950	141	1.37	50
580	-	-	-	-	-	-	-	-	-	-	-	-	1	1	581	2300	-	1.17	-
TOTAL	95						10						110						
MEAN			459	1210	239	1.24			478	1455	309	1.32			463	1253	275	1.25	10

Appendix 12. Biological data by age group for yellow walleye caught by gillnets from Little Buffalo River, 1975.

AGE (YR)	MALES N	MALES %	MALES LENGTH(MM) MEAN	MALES LENGTH(MM) SD	MALES WEIGHT(G) MEAN	MALES WEIGHT(G) SD	MALES K	FEMALES N	FEMALES %	FEMALES LENGTH(MM) MEAN	FEMALES LENGTH(MM) SD	FEMALES WEIGHT(G) MEAN	FEMALES WEIGHT(G) SD	FEMALES K	COMBINED N	COMBINED %	COMBINED LENGTH(MM) MEAN	COMBINED LENGTH(MM) SD	COMBINED WEIGHT(G) MEAN	COMBINED WEIGHT(G) SD	COMBINED K	% FEMALE
7	4	5	417	40.8	900	339	1.20	-	-	-	-	-	-	-	4	4	417	40.8	900	339	1.20	-
8	12	14	437	24.1	1021	186	1.21	1	11	452	-	1150	-	1.25	13	14	438	23.5	1031	182	1.21	8
9	18	21	438	31.6	1044	204	1.23	3	33	448	22.1	1217	236	1.34	21	22	439	30.2	1069	212	1.25	14
10	19	23	465	17.2	1250	120	1.24	2	22	486	19.8	1525	177	1.33	21	22	467	18.0	1276	153	1.25	10
11	17	20	469	19.6	1312	161	1.26	3	33	495	19.5	1550	173	1.27	23	24	476	21.7	1376	188	1.27	15
12	11	13	480	21.6	1391	215	1.25	-	-	-	-	-	-	-	11	11	480	21.6	1391	215	1.25	-
13	2	2	500	7.8	1700	71	1.29	-	-	-	-	-	-	-	2	2	500	7.8	1700	71	1.29	-
14	1	1	490	-	1500	-	1.27	-	-	-	-	-	-	-	1	1	490	-	1500	-	1.27	-
TOTAL	84							9							96							
MEAN			457	30.8	1201	247	1.24			473	28.0	1380	241	1.30			460	30.9	1229	254	1.25	10
MEAN AGE	10.0																					

Appendix 13. Biological data by length interval for northern pike caught by gillnets from Little Buffalo River, 1977.

LENGTH INTERVAL (MM)	MALES						FEMALES						COMBINED						% FEMALE
	N	%	LENGTH(MM) MEAN	WEIGHT(G) MEAN	WEIGHT(G) SD	K	N	%	LENGTH(MM) MEAN	WEIGHT(G) MEAN	WEIGHT(G) SD	K	N	%	LENGTH(MM) MEAN	WEIGHT(G) MEAN	WEIGHT(G) SD	K	
600	-	-	-	-	-	-	1	33	617	1800	-	0.77	1	14	617	1800	-	0.77	-
620	2	50	627	2125	106	0.86	-	-	-	-	-	-	2	29	627	2125	106	0.86	-
640	1	25	642	1375	-	0.52	2	67	649	2213	265	0.81	3	43	647	1933	519	0.72	67
660	1	25	662	1850	-	0.64	-	-	-	-	-	-	1	14	662	1850	-	0.64	-
TOTAL	4						3						7						
MEAN			639	1869	359	0.72			638	2075	303	0.80			639	1957	327	0.75	43

Appendix 14. Daily record of water and air temperatures and water levels at Little Buffalo River, 1975.

Date		Daily water temp (°C) max.	min.	Daily air temp (°C) max.	min.	Water Level (cm)
August	18	16	15	20	2	50
	19	16	15	27	2	55
	20	17	16	22	2	52
	21	17	15	21	7	50
	22	17	15	20	7	49
	23	16	15	15	6	51
	24	16	15	13	10	53
	25	16	15	16	6	53
	26	15	15	20	-1	65
	27	15	15	22	8	98
	28	15	15	22	5	118
	29	16	15	20	8	135
	30	16	15	18	9	157
	31	15	14	12	1	164
September	1	14	13	12	1	173
	2	13	13	22	5	178
	3	13	13	16	-1	184
	4	13	13	18	3	190
	5	13	12	16	7	193
	6	13	12	20	-1	193
	7	13	12	23	7	192
	8	13	12	10	6	193
	9	12	12	7	4	191
	10	12	11	7	2	185
	11	11	10	-	-	-
	12	11	11	-	-	-
	13	11	10	-	-	175
	14	11	10	-	-	173
	15	11	10	-	-	-
	16	11	8	16	-3	169
	17	11	8	11	7	168
	18	10	10	15	-1	164
	19	10	8	23	8	162
	20	10	10	17	7	163
	21	10	9	19	4	161
	22	10	9	17	4	160
	23	10	10	19	4	158
	24	10	10	14	3	155
	25	11	10	11	2	153
	26	10	9	8	4	151
	27	10	9	6	1	149
	28	9	8	6	-1	148
	29	9	8	6	-3	148
	30	8	7	13	1	145
October	1	8	8	20	3	146
	2	7	7	16	3	147
	3	7	7	9	-1	146
	4	7	7	8	0	147
	5	6	6	1	-3	146
	6	6	6	-2	-3	147